MATERIAL SAFETY DATA SHEET

1. PRODUCT DESCRIPTION

Product Description: Industrial Nickel-Iron (NiFe) Rechargeable Battery

Product Model: TN, NF-S

Standard designation: In accordance with China National Standard/ Company Standard.

Positive electrode: Nickel hydroxide

Negative electrode: Iron hydroxide

Electrolyte: Potassium hydroxide solution.

The respective percentage contents of nickel and iron are 20% and 60%.

Electrochemistry reaction formula: $2Ni(OH)_2 + Fe(OH)_2 = 2\beta\text{-}NiOOH+Fe+2H_2O$

Nominal voltage: 1.2Volts

2. COMPANY IDENFICATION

Supplier Name: Sichuan Changhong Battery Co., Ltd.
Address: NO.18 NANTA ROAD, SECTION 1, MIANYANG, CHINA
For emergency assistance, call:0086-816-2863230/2863219
Order On line: info@changhongbatteries.com

3. PRODUCT APPLICATION

The Industrial Nickel-Iron (NiFe) Rechargeable Batteries are widely applicable for PV power supply system, energy storage application and other more renewable energy applications.

4. CHEMICAL COMPOSITION

SUBSTANCES CLASSIFICATION	CHEMICAL INGREDIENTS	QUANTITY
Metals	Fe、Ni、Co 、Cu	60%～70%
Plastics	PA /ABS/PVC/PE	5%～10%
others	KOH、LiOH、H2O	15%～30%

5. PHYSICAL PROPERTIES

Temperature range (ambient °C)

Cell type	Continuous	Occasional
Steel container	-40 +50	-50 +85
Plastic container	-40 +50	-50 +70

6. FIRE AND EXPLOSION HAZARDS

Burning Point -	＞100℃	Melting Point -	Not applicable
Vapor Pressure -	2 mm Hg at 68°F	self-ignition Point	None
Specific Gravity -	1.170 - 1.250 (electrolyte)		

According to our certification for Safe Transport of Chemical Goods issued by Shanghai Research Institute of Chemical Industry Testing Centre, the substance in our industrial Nickel Iron (NiFe) rechargeable batteries does not belong to flammable solid, oxidizing substances, toxic substances and presents no explosive hazard.

7. CHEMICAL HAZARDS INFORMATION

Electrochemistry reaction formula: $2Ni(OH)2 + Fe(OH)2 = 2\ \beta\text{-}NiOOH+Fe+2H2O$

In normal use the only chemical risk is the caustic nature of the electrolyte. Precautions must be taken when emptying and filling the battery cells.

In case of misuse (abusive over charge, reverse charge, external short circuit) and in case of default, some electrolyte can leak from the cell with electrolyte through the safety vent. The toxic properties of the electrode materials are hazardous only if the materials are released by mechanical damaging the cell or if exposed to fire. Please note that the rechargeable Ni-Iron (NiFe) batteries are delivered from factory in fully discharged and empty (unfilled) state, so there is no electrochemistry reaction during transportation.

8. SPECIAL PROTECTION INFORMATION

For protection, wear working clothes, protective glasses, rubber apron, rubber gloves and rubber overshoes during electrolyte preparing and filling.

Please pay special attention when installing batteries (installing and connecting parts in particular), avoiding short circuit on both terminals caused by tools and metals. Any tools are forbidden to put in battery case.

Hand Protection: If exposure to electrolyte solution or dried salts is likely, use any water-insoluble, non-permeable glove, i.e., synthetic rubber.

9. EMERGENCY FIRST AID

Electrolyte:	(Electrolyte is 18-28% Potassium Hydroxide or KOH) Please note that the rechargeable Ni-Iron (NiFe) batteries are delivered from factory in fully discharged and empty (unfilled) state
Eye Contact:	If the electrolyte spatters into eyes, clean it with plenty of clean water and obtain immediate medical attention, if necessary.
Skin Contact:	Remove contaminated clothing and flush affected areas with 3% boric acid solution firstly, and then clean the skin with plenty of clean water.
Ingestion:	Do not induce vomiting. Dilute by giving large volumes of water or milk. Get immediate medical attention.
Inhalation:	Remove to fresh air. Give oxygen or artificial respiration if needed. Get immediate medical attention.

10. TRANSPORTATION

The industrial rechargeable Ni-Iron (NiFe) batteries are delivered from factory in fully discharged and empty (unfilled) state, so there is no electrolyte during transportation.
After the safe transport test by Shanghai Research Institute of Chemical Industry Testing Centre, our industrial Nickel Iron (NiFe) rechargeable batteries are not subject to IMO IMDG CODE and the goods are packaged according to the packaging requirement of ordinary goods.

11. HANDLING AND STORAGE

Handle and store cells filled with electrolyte always with vents upwards. Battery room should avoid highlight and keep away from fire source and acid substances. The battery room should be well ventilated.

12. DISPOSAL INFORMATION

Industrial nickel Iron rechargeable batteries can be fully recyclable. As regards of recycling of our used Ni-Iron (NiFe) cells, it is advisable to add the adequate H_2SO_4 solution into the used electrolyte of our Ni-Iron (NiFe) cells to generate neutralization reaction: $2KOH+H_2SO_4= K_2SO_4+2H_2O$. K_2SO_4 isn't pollutant.
You may refer to the following web page for further information or contact different National Battery Associations and National Collection & Recycling Organization that can provide you with the latest update on collection & recycling in their respective Countries.

13. STABILITY AND REACTIVITY

Industrial nickel Iron (NiFe) rechargeable batteries are stable in storage. In case of storage in Humidity, some rust may appear on the product. In case of storage in a charged state, progressively lose their energy, generating eventually a progressive temperature increase according the thermal insulation efficiency of the packaging. In case of exposure to temperature over 100°C, a risk of release of alkaline electrolyte mist or liquid is created. A higher temperature (160°C) the plastics used can melt or decompose (Polyamide gasket, rubber valve, PVC container). In case of mechanical deterioration of the cells, active materials contained as powder can be dispersed (Nickel, Cobalt, Iron).

14. ACCIDENTAL RELEASE MEASURES

When removing battery from service, visually inspect for leakage prior to handling. If there is leakage occurs, flush the electrolyte spillage with plenty of water.

15. PRECAUTIONS AND COMMENTS

These batteries may be highly charged and are capable of high energy discharge. Special care should be taken to handle them properly to avoid shorting or misuse that will result in a rapid, uncontrolled electrical, chemical, or heat energy release. Do not transport activated batteries without vent caps in place. Do not allow an exposed flame or spark to come near the cells.

16. OTHER INFORMATIONS

Consult CHANGHONG specifications and precautions of use for optimized use.

The information contained within is provided as a service to our customers and for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate at the date compiled. Changhong makes no warranty expressed or implied.